

SESSION 12. QUALITY ASSESSMENT AND ASSURANCE IN THE CIVIL REGISTRATION AND VITAL STATISTICS SYSTEM

UNITED NATIONS STATISTICS DIVISION

Workshop on the Principles and Recommendations for a Vital Statistics
System, Revision 3 for Central American and Caribbean countries

Guatemala City, 30 August - 2 September 2016



UN Statistics
Division



Organization of
American States



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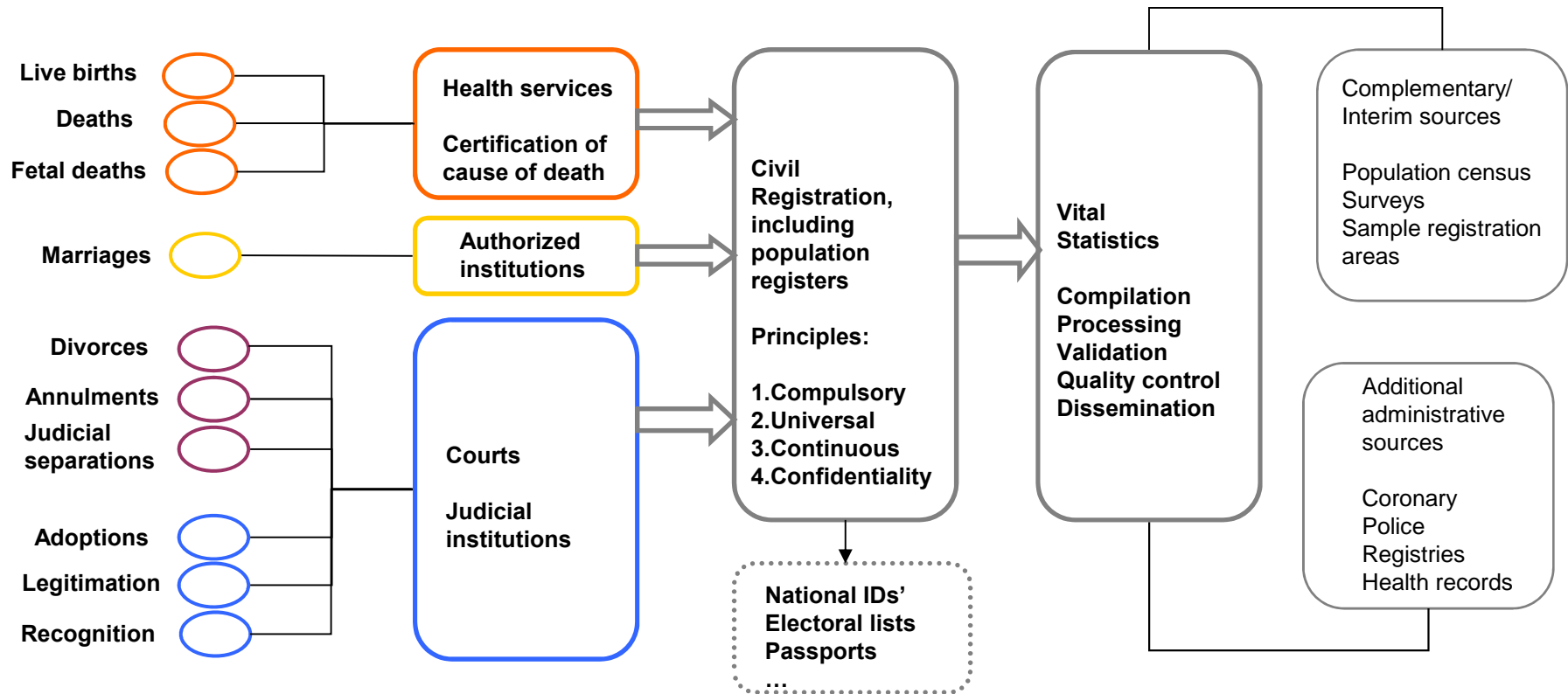
Pan American
Health
Organization



Evaluation is essential



Vital Statistics System



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Quality basic framework



Adequately funded evaluation activities are essential

- For improving systems that have deficiencies
- For maintaining systems that function satisfactorily

Strong mandate in Sustainable Development Agenda

- Indicator 16.9.1: Percentage of children under 5 whose births have been registered
- Indicator 17.19.2: Proportion of countries that...
(b) have achieved 100 per cent birth registration and 80 per cent death registration
- Other 9 indicators that use CRVS data as input



Quality basic framework



Quality assurance

- Encompasses each stage of CRVS operations
- All vital events are registered without duplication
- All related information is recorded
- Information is compiled, validated and processed
- Vital statistics are released in timely manner

Quality assessment

- Specific studies for specific questions
- Coverage of registration of vital events
- Accuracy of variables
- Overall functioning of sub-systems
- Can be ad hoc or regular exercises



Standards



Completeness

Correctness
or Accuracy

Availability

Timeliness

Completeness

- * Every vital event is registered
- * Statistical report is filed for every registered event
- * Coverage error

Correctness

- * Every data item is filled
- * Data items are accurately filled
- * Content error

Availability

- * Data and statistics are available to users in a friendly format

Timeliness

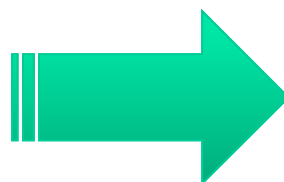
- * CR: events are registered within time limit and statistical reports are filed according to schedule
- * VS: prompt dissemination



Quality assessment methods

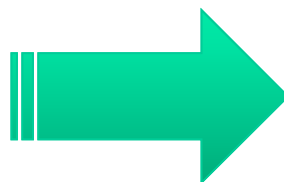


Direct methods



Matching of records

Indirect methods



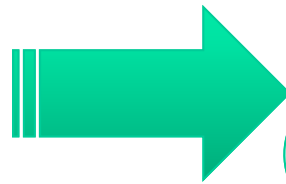
Demographic analysis



Quality assessment. Direct methods



Matching of
records



Match registration
records with records
from an
independent source



Quality assessment.

Direct methods



Matching:

- **Birth registration with death registration**
 - limited to infants deaths
 - can be carried out routinely
- **With administrative records**
 - a variety of sources can be used
 - however, none is complete
 - useful to detect certain type of underreporting



Quality assessment.

Direct methods



Matching:

- **Lists from population censuses and surveys**
 - compiled from questions on births and deaths
 - can lead to an estimate of completeness
 - national or sub-national level
- **Dual records system**
 - a particular case of the lists
 - survey specifically to collect information on vital events
 - the two sources are confronted



Quality assessment.

Direct methods



Matching basic logic:

| | Civil Registration | Survey/ Census | Result |
|----------|--------------------|-------------------|----------------------|
| Case 1 | X | X | <i>Matched</i> |
| Case 2 | X | | <i>Not in survey</i> |
| Case 3 | | X | <i>Not in CR</i> |
| ... | | | ... |
| ... | | | ... |
| Case n-1 | | | |
| Case n | | | |

| Result | Count |
|----------------------|-------|
| <i>Matched</i> | 1000 |
| <i>Not in survey</i> | 120 |
| <i>Not in CR</i> | 230 |

| | |
|-------------------------------|------------------|
| <i>Missing in both</i> | <i>??</i> |
|-------------------------------|------------------|

| | | | |
|---------------|--|--|-------------------------------|
| Case 4 | | | <i>Missing in both</i> |
|---------------|--|--|-------------------------------|



Quality assessment. Direct methods



Matching basic logic:

| Survey /Census | Civil Registration | | Total |
|----------------|----------------------|------------------------|-------------|
| | Yes | No | |
| Yes | <i>Matched</i> | <i>Not in CR</i> | <i>M+NR</i> |
| No | <i>Not in survey</i> | <i>Missing in both</i> | |
| Total | <i>M+NS</i> | | <i>N</i> |

Chandrasekaran-Deming formula

$$N = \frac{(M + NS) * (M + NR)}{M}$$



Quality assessment.

Direct methods



Matching basic logic:

| Survey/ Census | Civil Registration | | Total |
|-------------------|-----------------------|--------------------|---------------|
| | Yes | No | |
| Yes | 1000 | 230 | 1230 |
| No | 120 | Missing in both | 147 |
| Total | 1120 | 257 | N=1377 |

| | |
|--------------------|----------------|
| Missing in both | ?? = 27 |
|--------------------|----------------|

Chandrasekaran-Deming
formula

$$N = \frac{(1000+230)*(1000+120)}{1000}$$

$$N = 1377.6$$

$$\text{Undercoverage} = \frac{27}{1377} = 1.96\%$$



Quality assessment.

Indirect methods



- Comparison of trends
- Delayed registration
- Questions on birth registration in surveys or censuses

Demographic
analysis

- **Comparison with census data**
 - If at least two censuses: balancing equation, Lexis diagram
 - If only one census: compare aggregates
- **Methods for incomplete data**
 - *Manual X*
 - *Tools for Demographic Estimation* (online and print update of *Manual X*,
<http://demographicestimation.iussp.org/>)



Direct or indirect ?



| | Advantages | Limitations |
|------------------|---|---|
| Direct methods | <ul style="list-style-type: none">• More accurate assessment of registration completeness• May indicate sources of under or overregistration• Can be applied at any geographical level | <ul style="list-style-type: none">• Accuracy is affected by the choice of the second source of records• True independency of the second source is unlikely• Matching criteria difficult to find if there is no ID number• If manual: time consuming• If automated: computer algorithms can get too complex• Cost |
| Indirect methods | <ul style="list-style-type: none">• Prompt assessment of vital statistics completeness• Several can be applied at various geographical levels | <ul style="list-style-type: none">• Some have assumptions that may not hold• Some require reliable data from two censuses• Accuracy is affected by the degree of census completeness |



Direct or indirect ?



Choosing the appropriate method depends on:

- Objectives
- Degree of precision
- Timeliness
- Type of event
- Resources



Gracias Thank You
Merci Спасибо
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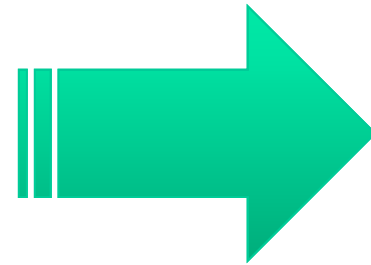
Quality assessment.

Direct methods



Practical example: Health services of the state of Queensland, Australia

Primary source:
Perinatal Data
Collection



Secondary
source:
Birth
registration

Linkage file:
file containing
person identifiers
from various
admin. sources



Direct methods. Practical example: Health services of the state of Queensland, Australia

Some results

- 2.7% of Perinatal Data records could not be linked to Registration data.
- Significant differences in linkage according to ethnic groups

| | |
|-------------------------------|-----------------------------|
| Indigenous mothers | 15-18% undercoverage |
| Non-indigenous mothers | 1.8% undercoverage |

- Remote and very remote geographical areas also had high rates of under-registration

<https://www.health.qld.gov.au/hsu/peri/underreg.pdf>



Direct or indirect ?



- If vital statistics are compiled fully from civil registration, both direct and indirect measure the quality of civil registration and vital statistics.
- However, coverage and accuracy of vital statistics are also affected by the steps in the production
- When the two systems do not correspond completely, measures of quality of one system cannot be used to represent another



UN international demographic data collection

- Major vehicles for dissemination of population and vital statistics:
- UN Demographic Yearbook (DYB) both in print and electronic



<http://unstats.un.org/unsd/demographic/products/dyb/dyb2.htm>

- UN Data website

<http://data.un.org/>



Data Glossary Metadata API More

34 databases - 60 million records Update calendar

| Databases | Updates | Country data services |
|---|--|--|
| Crime <ul style="list-style-type: none">◦ UNODC Homicide Statistics 2012, UNODC | @undata 2 Feb World Telecommunication/ICT Indicators Database & WTI table updated in @UNdata; Thanks @ITU; bit.ly/20Ek09P, bit.ly/1Q9PE7I | Afghanistan Albania Algeria Andorra |



UN international demographic data collection



- This mandate comes from the earliest times of the Organization
- Based on sending a set of questionnaires to national statistics authorities

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Data Availability Report

Show availability for:

Show

E01 Live births by sex and urban/rural residence

1930

[Romania](#)

1934

[Albania](#)

1935

[Albania](#)

1936

[Albania](#)

1937

[Albania](#)

1938

[Albania](#) [Romania](#)

1939

[Albania](#)

1940

[Albania](#) [Romania](#)

1941

[Albania](#)

1942

[Albania](#)

1945

[French Polynesia](#)

1946

[Albania](#) [French Polynesia](#)

1947

[Albania](#) [French Polynesia](#)



Demographic Yearbook (DYB)



Data collected

- Vital statistics
- Population estimates
- International migration
- Population and housing censuses
 - General characteristics
 - Economic characteristics
 - Housing
 - Household characteristics

Metadata collected

- Quality
- Methods



Vital statistics questionnaire



Collection of tables distributed in 10 sections:

1. VS summary by urban/rural residence

2. Live births

3. Fertility rates

4. Life Tables

5. Deaths

6. Infant deaths (deaths under 1 year of age)

7. Foetal deaths and Late foetal deaths

8. Legally induced abortions

9. Marriages

10. Divorces



International comparability depends on:

- Completeness and accuracy of data
- Differences in statistical definitions
- Diverse tabulation procedures
- Figures coming from different types of sources

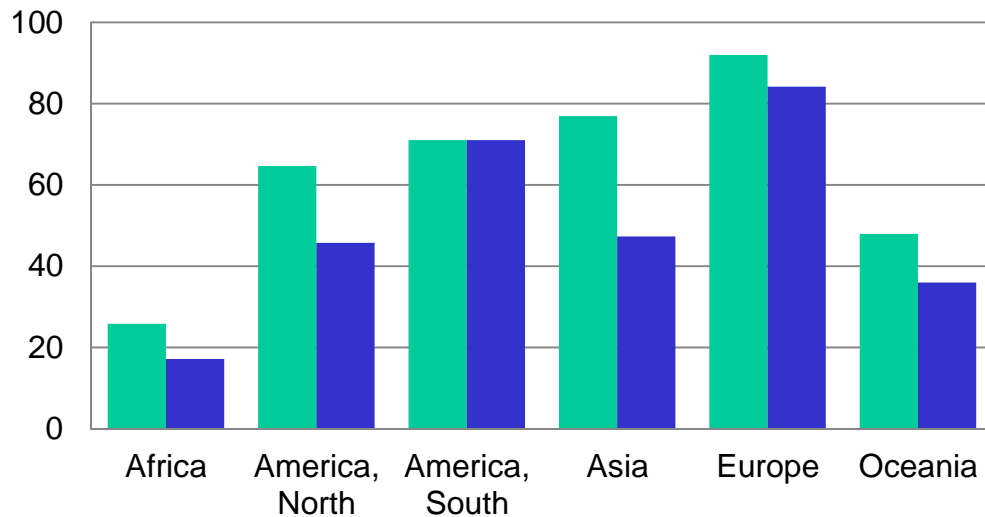


How complete are the data sent from countries?

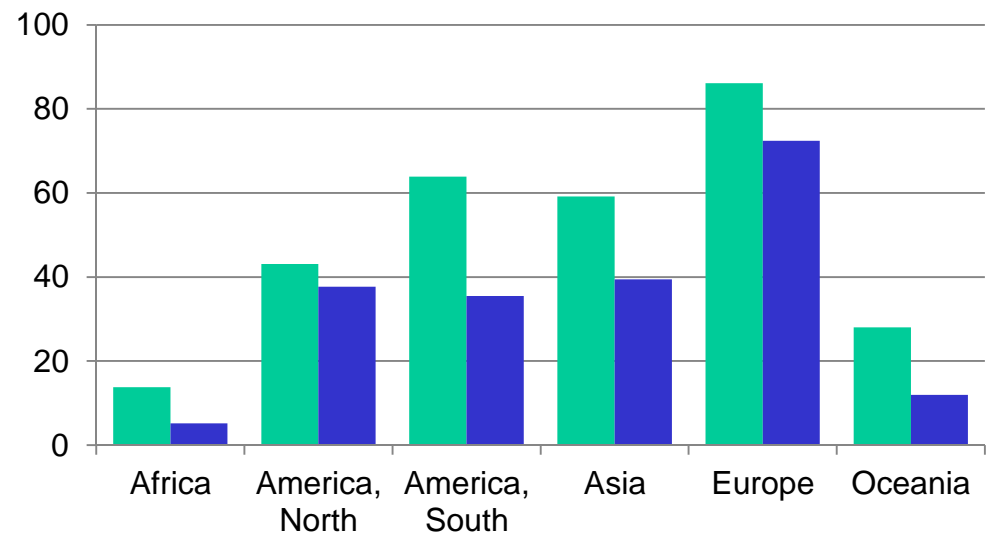
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Percentage of countries that sent data to UNSD in the last five years



■ Live births by sex and urban/rural residence
■ Live births by age of mother and sex of child

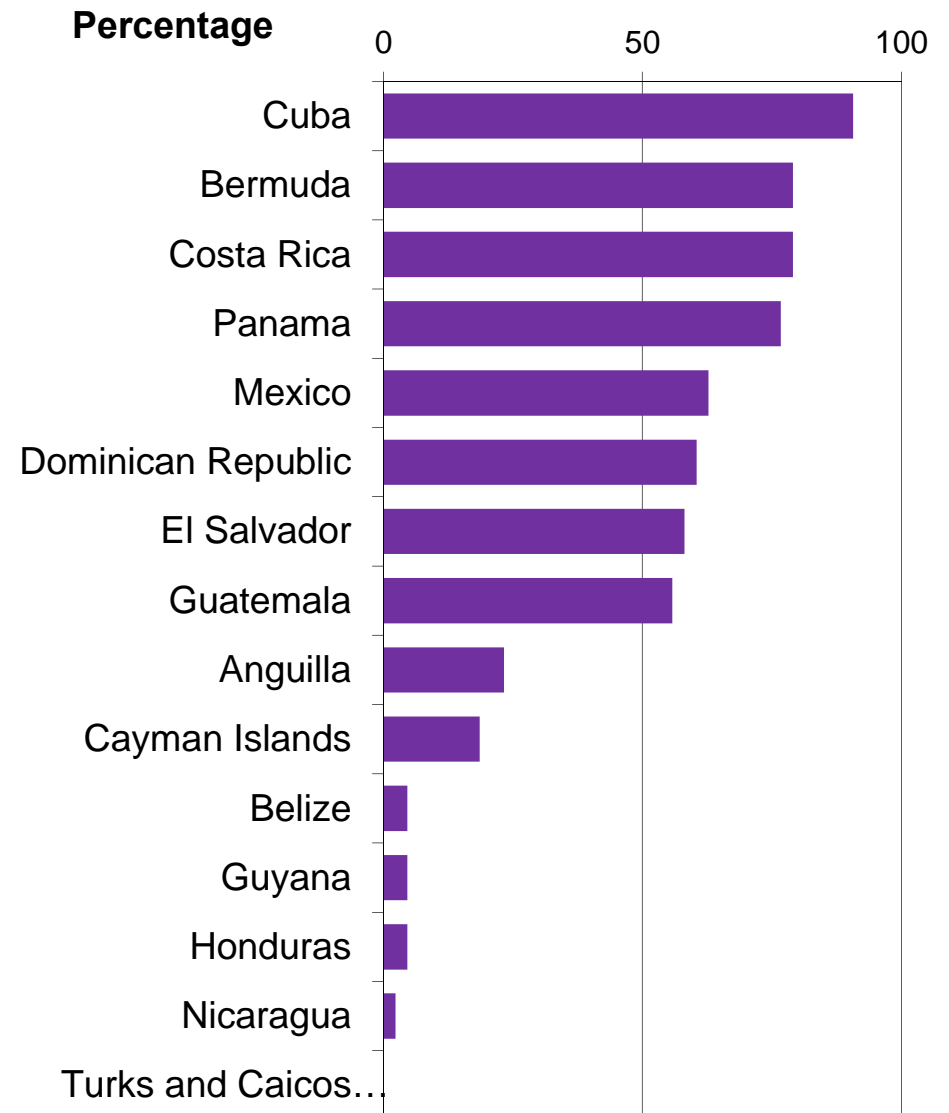
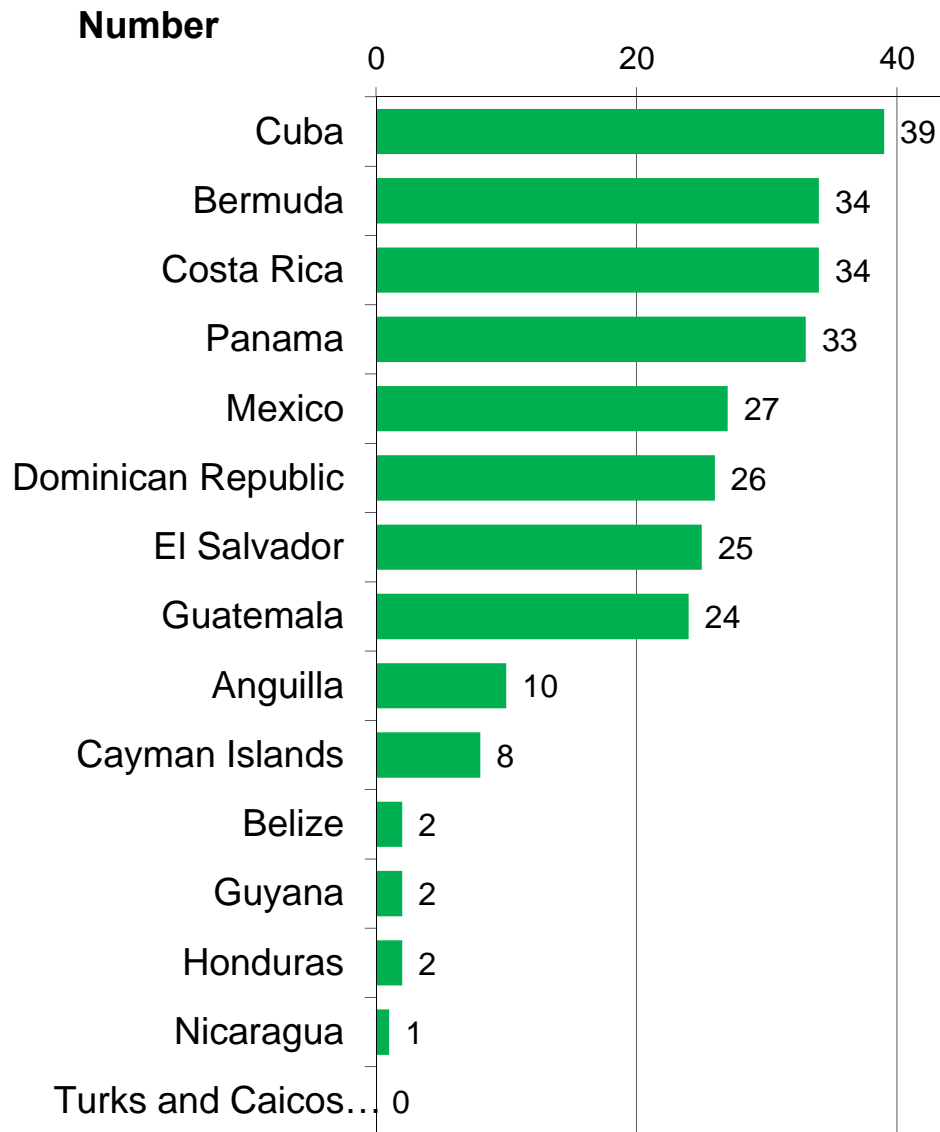


■ Infant deaths by sex and urban/rural residence
■ Infant deaths by age and sex





VS tables provided in the last five years





A look at specific tables, last 5 years



Table E01 – Live births by sex and urban/rural residence

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|------|------|------|------|------|
| Anguilla | ✓ | ✓ | ✓ | ✓ | |
| Belize | ✓ | | | | |
| Bermuda | ✓ | ✓ | ✓ | ✓ | ✓ |
| Cayman Islands | ✓ | ✓ | ✓ | ✓ | |
| Costa Rica | ✓ | ✓ | ✓ | ✓ | ✓ |
| Cuba | ✓ | ✓ | ✓ | ✓ | |
| Dominican Republic | ✓ | ✓ | ✓ | ✓ | |
| El Salvador | ✓ | ✓ | | | |
| Guatemala | ✓ | ✓ | ✓ | ✓ | |
| Guyana | | | | | |
| Honduras | ✓ | | | | |
| Mexico | ✓ | ✓ | ✓ | | |
| Nicaragua | | | | | |
| Panama | ✓ | ✓ | ✓ | ✓ | ✓ |
| Turks and Caicos Islands | | | | | |



A look at specific tables, last 5 years



Table E04 – Live births by age of mother and sex of child

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|------|------|------|------|------|
| Anguilla | | | | | |
| Belize | | | | | |
| Bermuda | ✓ | ✓ | ✓ | | |
| Cayman Islands | ✓ | ✓ | ✓ | ✓ | |
| Costa Rica | | ✓ | ✓ | ✓ | ✓ |
| Cuba | ✓ | ✓ | ✓ | ✓ | |
| Dominican Republic | ✓ | ✓ | ✓ | ✓ | ✓ |
| El Salvador | ✓ | ✓ | | | |
| Guatemala | ✓ | | | | |
| Guyana | | | | | |
| Honduras | | | | | |
| Mexico | ✓ | | ✓ | | |
| Nicaragua | | | | | |
| Panama | ✓ | ✓ | ✓ | ✓ | |
| Turks and Caicos Islands | | | | | |



A look at specific tables, last 5 years



Table H02 – Infant deaths by age and sex

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------------------|------|------|------|------|------|
| Anguilla | | | | | |
| Belize | | | | | |
| Bermuda | ✓ | ✓ | | | |
| Cayman Islands | | | | | |
| Costa Rica | ✓ | | ✓ | ✓ | ✓ |
| Cuba | ✓ | ✓ | ✓ | ✓ | |
| Dominican Republic | ✓ | ✓ | ✓ | ✓ | |
| El Salvador | ✓ | ✓ | | | |
| Guatemala | ✓ | | | | |
| Guyana | | | | | |
| Honduras | | | | | |
| Mexico | ✓ | ✓ | ✓ | ✓ | |
| Nicaragua | | | | | |
| Panama | ✓ | ✓ | ✓ | ✓ | |
| Turks and Caicos Islands | | | | | |



What is the quality of data sent from countries?

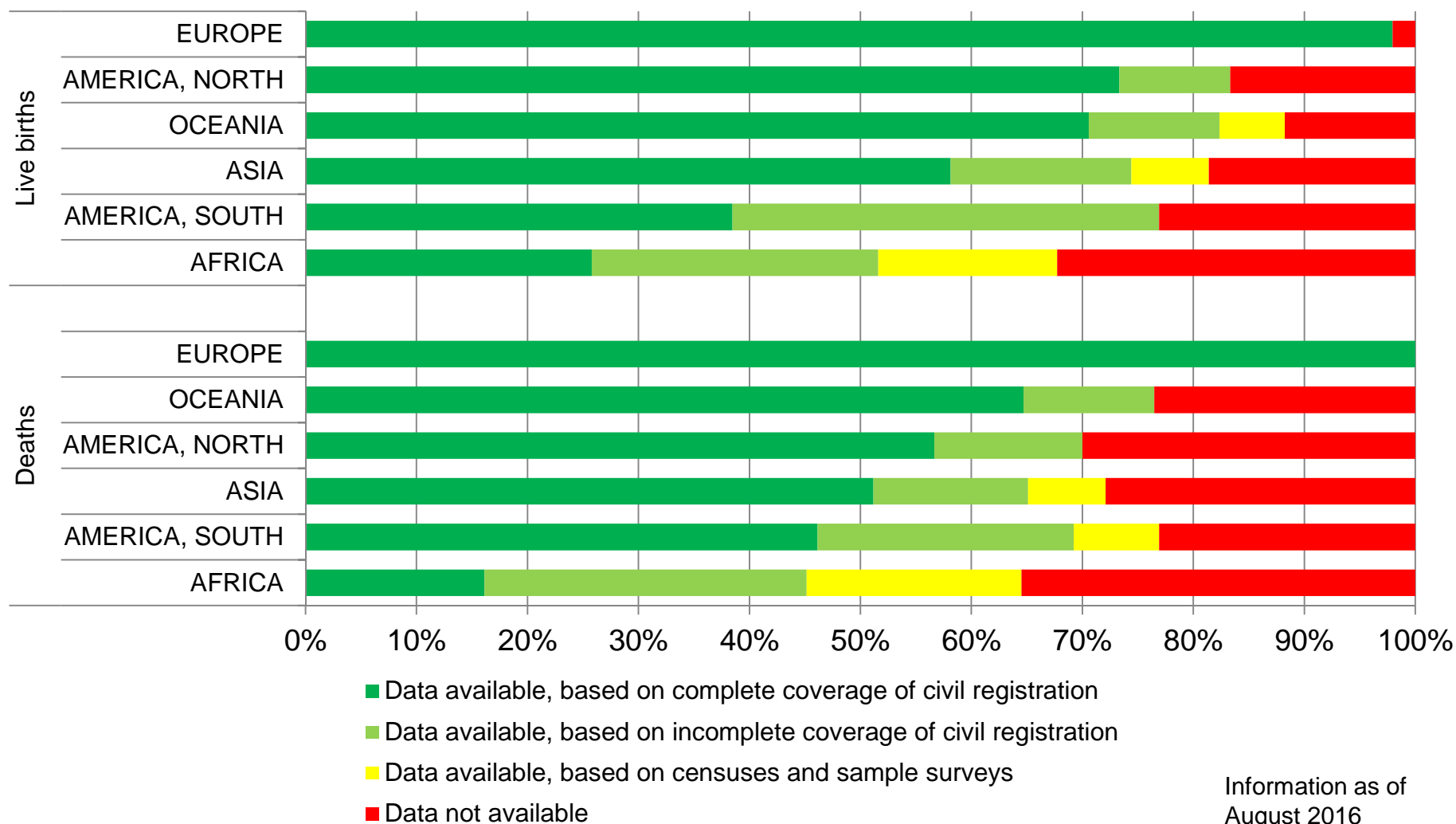
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Availability and quality of VS



Percentage of countries



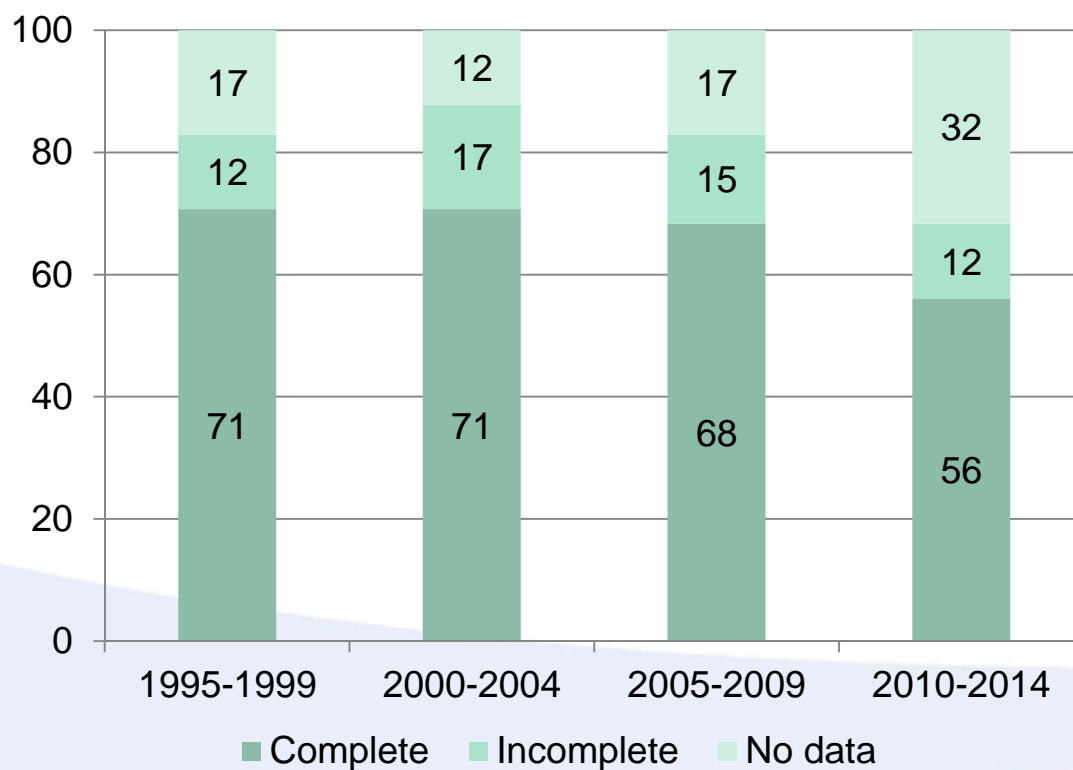
Information as of August 2016



Availability and quality of VS



North America. Percentage of countries/areas reporting total deaths





Availability and quality of VS



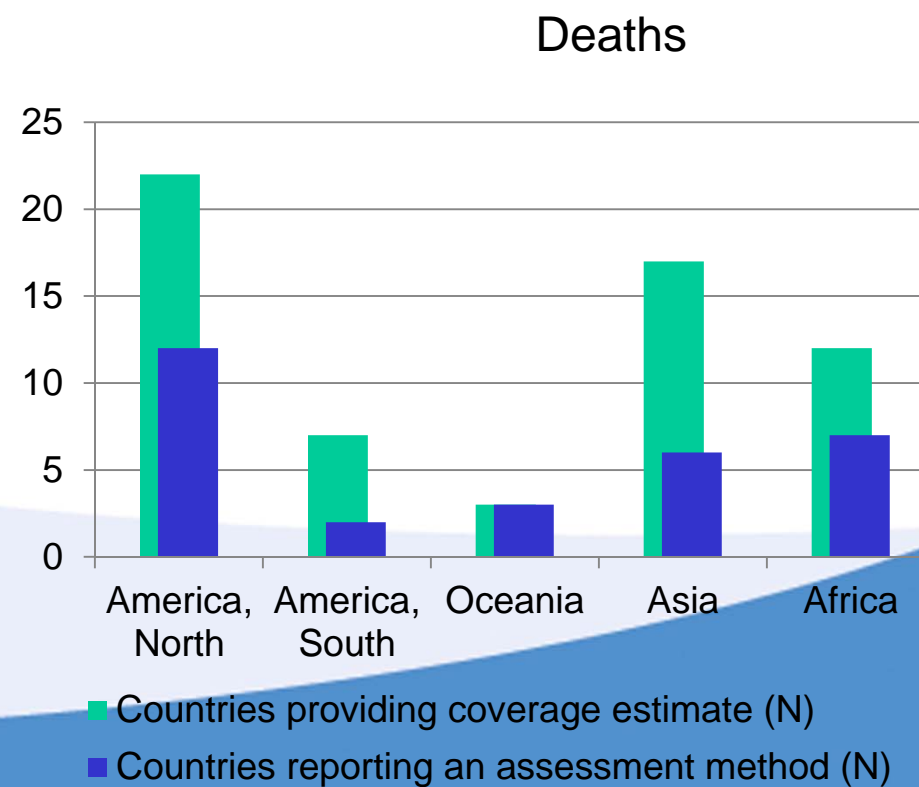
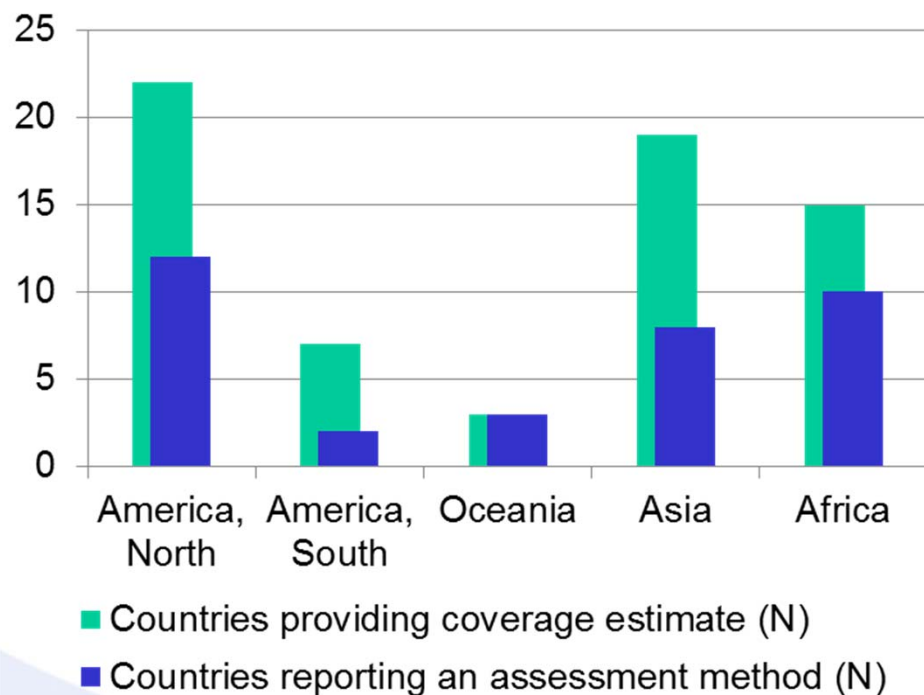
| Level of completeness (%) | Births | Deaths |
|---------------------------|---|---|
| 90 + | Anguilla, Aruba, Bermuda, Canada, Cayman Islands, Costa Rica, Cuba, Curaçao, Greenland, Guadeloupe, Guatemala, Jamaica, Martinique, Mexico, Montserrat, Panama, Puerto Rico, Saint Lucia, United States of America, Argentina, Chile, Ecuador, French Guiana, Suriname, Uruguay | Anguilla, Aruba, Bahamas, Bermuda, Canada, Cayman Islands, Costa Rica, Cuba, Curaçao, Greenland, Guadeloupe, Guatemala, Martinique, Mexico, Montserrat, Puerto Rico, Saint Lucia, United States of America, Argentina, Chile, Ecuador, French Guiana, Suriname, Uruguay |
| 75-89 | Bahamas, Nicaragua, Peru | Jamaica, Panama |
| 50-74 | Dominican Republic | Dominican Republic, Nicaragua, Peru |
| < 50 | | |

Information as of February 2015

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Availability and quality of VS





Importance of providing data and metadata for dissemination



- * Enabling social and public health studies
- * Informed decisions at the national and international level

- * Representation in the international setting
- * International comparability



Gracias Thank You
Merci Спасибо
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demostat@un.org
dybquest@un.org

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